

Any n -element vector y can be written

$$y = \gamma_1 q_1 + \gamma_2 q_2 + \cdots + \gamma_n q_n,$$

in terms of orthonormal basis vectors q_i , and

$$\|y\|^2 = \gamma_1^2 + \gamma_2^2 + \cdots + \gamma_n^2.$$